

eastward, cold northwesterly winds prevailed to the northward of Alabama, while in the southern portion of the East Gulf States warm southerly winds obtained, showing a contrast in temperature of from 15° to 20°.

## VERIFICATIONS.

*Indications.*—The detailed comparison of the tri-daily indications for March, with the telegraphic reports for the succeeding twenty-four hours, shows the general percentage of verifications to be 85.3 per cent. The percentages for the four elements are: Weather, 86.7; Direction of the Wind, 82.7; Temperature, 87.4; Barometer, 84.5 per cent. By geographical districts they are: for New England, 86.2; Middle States, 88.7; South Atlantic States, 89.5; Eastern Gulf States, 86.4; Western Gulf States, 86.6; Lower Lake region, 84.7; Upper Lake region, 78.4; Tennessee and the Ohio valley, 86.3; Upper Mississippi valley, 81.7; Lower Missouri valley, 84.8; Northern Pacific coast region, 90.9; Central Pacific coast region, 86.5; Southern Pacific coast region, 94.6. There were 124 omissions to predict (55 being due to the absence of reports from the Pacific coast) out of 3,813 or 3.36 per cent. Of the 3,689 predictions that have been made, 165, or 4.47 per cent, are considered to have entirely failed; 130, or 3.53 per cent, were one fourth verified; 369, or 10.00 per cent, were one-half verified; 361, or 9.78 per cent, were three-fourths verified; 2,664, or 72.22 per cent, were fully verified, so far as can be ascertained from the tri-daily reports.

*Cautionary Signals.*—218 Cautionary Signals were displayed during the month, of which 199, or 91.3 per cent, were fully justified by winds of 25 miles per hour or over at, or within a radius of 100 miles of, the station. 130 Off-shore Signals were displayed, of which 99, or 76.2 per cent, were fully justified; 121, or 93.1 per cent, justified as to direction; 104, or 80.0 per cent, justified as to velocity, and 4, or 3.1 per cent, completely failed. 90 of the Off-Shore and 2 of the "Northwest" Signals were changed from Cautionary. Six "Northwest" Signals displayed on the Lakes were fully justified. 354 Signals of all kinds were displayed, of which 304, or 85.9 per cent, were fully justified. The above does not include signals ordered at display stations where the velocity is only estimated. 71 winds, of 25 miles or over, were reported, for which no signals were ordered. Fourteen signals were ordered late.

## NAVIGATION.

*Stage of Water in Rivers.*—In the table on the right-hand side of chart No. III are given the highest and lowest stages of water, as observed on the Signal Service river-gauges, during the month of March, 1881. The principal rivers draining the Eastern Rocky Mountain Slope and those falling into the Atlantic and Gulf of Mexico from the South Atlantic and Eastern Gulf States have been subjected to high, rapid and dangerous rises during the month. The Red and Arkansas rivers reached their highest stages between the 1st and 7th, the former approaching within two feet of the danger-line. The Missouri, from Yankton to Leavenworth, reached its maximum stage between the 26th and 29th, reaching the danger-line at Omaha on the 27th. The Mississippi from La Crosse to St. Louis, reached its highest stage between the 26th and 31st; from Cairo to Memphis, between the 1st and 3rd, at the former station rising to 11 inches above the danger-line, and at the latter station to within 17 inches of it; from Vicksburg to New Orleans, between the 8th and 17th, rising 10 inches above the danger-line at the former station and to within four inches of it at the latter. In the Ohio, Cumberland, Monongahela and Tennessee rivers the highest stage was reached between the 20th and 26th. At Augusta on the Savannah, the water on the 18th rose to 32 feet, 4 inches, the highest point since 1865. The Williamette at Portland, Or., reached its maximum stage on the 3rd.

*Ice in Rivers and Harbors.*—The following items, relative to the formation or continuation of ice in such bodies of water throughout the northern sections of the country, exhibit the same for the month of March, 1881. The Missouri has broken up throughout nearly the whole of its course, as well as most of its tributaries, but the Mississippi at St. Paul and northward, still remains frozen. At all lake stations the ice has broken up and moved out, leaving navigation open and boats in many instances have been running regular trips. *Tongue River.*—Fort Keogh, 2nd, ice broke up and passed out; but little damage done. Miles City, 2nd, ice broke up and gorged at a point two miles above the city; water rose rapidly, flooding the streets to a depth of three feet; people left their houses in boats or whatever else would serve to float them; men were seen building boats and sawing and splitting wood on the house-tops. In several instances gorges were blown up with powder and dynamite; one gorge formed having a length of seven miles; damage to property very severe. *Yellowstone River.*—Ft. Keogh, 2nd, ice broke up and passed out causing no damage. Miles City, 2nd, river clear of ice, but water very high. *Little Missouri River.*—Deadwood, 25th, ice broke up during the night and passed out causing no damage. *Big Cheyenne River.*—Deadwood, 25th, ice broke during the afternoon; river gorged at several places. *Big Horn River.*—Ft. Custer, 2nd, ice broke up and passed out during the day. *Des Moines River.*—Ottumwa, 29th, ice gorge broke, filling the river with large quantities of heavy ice, which passed down the stream with resistless fury, carrying everything before it; wagon bridge, consisting of five iron spans, was destroyed entailing a loss of from \$8,000 to \$10,000; considerable damage to merchandise and warehouses along the banks of the river, and several